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The Shelf Life of Northwestern Anjou Pears in Retail Store Display Cases

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Introduction

The purpose of this study was to determine the effects of various display and handling practices upon the quality and condition of Northwestern Anjou pears. Tests were made during January and April, 1953, in a laboratory at Beltsville, Md., equipped to simulate several different retail store display practices.

Operation of the Display Room

The pears used in the tests were obtained in original containers from the Washington, D. C. wholesale produce market. The size of the pears used in different tests were 90's, 100's, and 110's.

The pears were displayed for 3 days as follows:

1. Continuously in a non-refrigerated case.
2. In a non-refrigerated case during the daytime and stored in 32° and 40° F. "walk-in coolers" at night.
3. In a mechanically refrigerated case (forced-air-circulation type).

A 6-foot wood display case with galvanized metal bottom and sides was used for non-refrigerated display. It was provided with a slatted rack sloping towards the front. The distance from the front to the back of the case was 30 inches.

A 10-foot commercial, mechanically refrigerated case (forced-air-circulation type) was used for one type of refrigerated display.

The display cases were in a room on the ground floor of a well insulated brick building.

A 32° and a 40° F. storage room were used for overnight storage of pears displayed during the daytime in the non-refrigerated case. The temperatures in these rooms were thermostatically controlled, and small fans were used to circulate the air. The relative humidity was kept at approximately 85 percent.

In each of the display cases, one lot was sprinkled several times daily and a duplicate lot was not sprinkled. However, the non-sprinkled pears that had been held overnight in the "coolers" became wet from condensed moisture when they were returned to the non-refrigerated rack each day.

The display period began between 8:00 A.M. and 9:00 A.M. when the pears were placed on the racks, and ended when they were prepared for night storage between 6:00 P.M. and 7:00 P.M.

The average daytime display room air temperatures during each of the testing periods were 73°, 77°, and 75° F.

Fruit temperatures were obtained with fruit thermometers and thermocouples which were inserted into pears located at similar positions on each of the display racks.

Decayed and otherwise defective pears were discarded and the remainder sorted into representative samples before they were arranged on the various racks. The pears were displayed 3 layers deep, extending from the front to the back of each rack. There were approximately 35 pears in each lot.

Results

The principal factors of quality and condition studied in these tests were weight changes, decay, discoloration, shriveling, yellowing, and resistance to pressure (tables1 & 2).

Decay, shriveling, and loss of weight were of no importance under any of the various handling practices at the end of the 3-day tests.

Most yellowing and the greatest reduction in resistance to pressure were found in pears held at the higher temperatures.

The development of unsightly discoloration, due to Anjou scald or following scratches and bruises, was the only objectionable change in the condition of the pears. Scald progressed most rapidly on the pears held continuously at room temperatures and was the principal cause of the discoloration of the non-refrigerated pears. No scald was found in pears held continuously in the mechanically refrigerated case, and very little in the pears stored overnight at 32° and 40° F. However, pears stored at night in the refrigerated rooms developed unsightly discoloration due to scratches and bruises that probably occurred when the pears were moved to and from the storage rooms. Pears displayed continuously in the mechanically refrigerated case showed very little discoloration of any kind at the end of the 3-day tests. Sprinkling with tap water several times daily reduced the percentage of discolored pears, but, due to a watersoaked condition where the skin had been broken, the discoloration on individual pears was more unsightly than on those that were not sprinkled.

Suggestions for Prolonging the Shelf Life of Anjou Pears

Refrigeration will retard the development of Anjou scald and other discoloration. Pears conditioned to a desirable stage of ripeness can be held in good condition for several days in mechanically refrigerated display cases.

Pears displayed without refrigeration should be moved quickly into consumption. Removal of pears to refrigerated rooms for night storage often results in

scratches and bruises that become badly discolored when the pears are again displayed at room temperatures. The handling of pears should be kept to a minimum; excessive handling should be discouraged.

Sprinkling with water is not advisable; it sometimes results in watersoaking at skin-breaks.

Table 1. Effect of Temperature on the Quality and Condition of Northwestern Anjou Pears in Retail Store Display Cases.

Treatment	Avge. 24-hr. fruit temp.	Weight loss	Discol-oration	Shriv-eling	Yellow-ing	Pressure Tests start	Pressure Tests end	Appear-ance ratings 1/
Displayed on -	°F.	%	%	%	%	lbs.	lbs.	points
Non-refrigerated case continuously	70	0.7	45	0.0	22	7.4	4.1	6.0
" " " days-40°F. nights	53	0.4	36	0.0	12	7.4	5.5	5.2
" " " " -32° "	48	0.2	19	0.0	10	7.4	5.9	5.7
Mechanically refrig. case continuously	45	0.2	5	0.0	2	7.4	6.1	8.3

1/ Appearance ratings were based upon a scale of 1 to 10 points, with 1 indicative of the lowest quality and 10 the highest.

Table 2. Effect of Sprinkling with Water on the Quality and Condition of Northwestern Anjou Pears in Retail Store Display Cases.

Treatment	Avge. 24-hr. fruit temp.	Weight loss	Discol-oration	Shriv-eling	Yellow-ing	Pressure tests Start	Pressure tests End	Appear-ance ratings 1/
	°F.	%	%	%	%	lbs.	lbs.	points
Sprinkled with tap water daily								
Non-refrigerated case continuously	69	0.5	38	0.0	20	7.4	4.1	6.0
" " " days-40°F. nights	51	0.0	28	0.0	12	7.4	5.5	5.7
" " " " -32° "	47	0.2	18	0.0	10	7.4	6.1	5.7
Mechanically refrig. case continuously	45	0.1	3	0.0	2	7.4	6.1	8.0
Averages	53	0.2	22	0.0	11	7.4	5.4	6.3
Not Sprinkled								
Non-refrigerated case continuously	71	0.9	53	0.0	25	7.4	4.1	6.0
" " " days-40°F. nights	53	0.9	45	0.0	12	7.4	5.5	4.7
" " " " -32° "	48	0.4	21	0.0	10	7.4	5.8	5.7
Mechanically refrig. case continuously	45	0.4	7	0.0	3	7.4	6.1	8.7
Averages	54	0.6	31	0.0	12	7.4	5.4	6.3
Differences between sprinkled and non-sprinkled	1	0.4	9	0.0	1		0.0	0.0

1/ Appearance ratings were based upon a scale of 1 to 10 points, with 1 indicative of the lowest quality and 10 the highest.